



Office of Research and Development  
National Health and Environmental Effects Research Laboratory  
**Mid-Continent Ecology Division (MED)**

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(revised 06/15/01)

**EDUCATION**

<u>Degree</u>	<u>Year</u>	<u>Major</u>	<u>Institution</u>
B.S.	1978	Chemistry, Biology (double major)	Viterbo College, LaCrosse, WI
Ph.D. Candidate	1991 - 1995	Toxicology (46 graduate credits in toxicology, biochemistry, physiology, statistics)	University of MN, Duluth, MN

Relevant Informal Training

ORD Project Officers Course for Assistance and IAG Management, MED, Duluth, MN (2000)  
EPA Contract Administration, MED, Duluth, MN (1999)  
ERDAS IMAGINE (image analysis software), 40 hr course, MED, Duluth, MN (1998)  
Comparative Endocrinology, 32 hr course, Duluth, MN (1995)  
AVS (visualization software), 32 hr course, Duluth, MN (1994)  
Exposure and Bioaccumulation of Toxicants in Surface Water Models, 40 hr U.S. EPA workshop, Washington, DC (1988)

**EXPERIENCE**

**Research Aquatic Biologist**

<u>Dates</u>	<u>Employer</u>
04/95 - Present	U.S. EPA 6201 Congdon Boulevard Duluth, Minnesota

**Brief Description of Position:** Provide support to the Watershed Sustainability and Diagnostics Team as lead investigator on “Pattern recognition in watershed vulnerability assessment.” Emphasis is on understanding the influence of landscape mosaics/ patch dynamics on ecological structure and processes, system vulnerability, and ecological recovery. Primary duties include project planning and implementation, multivariate statistical analysis, technical writing, and resource management. GIS, non-linear modeling, and chaos and fuzzy set techniques are used to aggregate/ integrate multiple stressors and interpret multiple response indicators toward the goal of identifying critical thresholds for landscape change. Facilitated \$300K capital equipment buy. Participate in Agency-wide and MED quality assurance and ADP workgroups.

Assisted in the development of ecological condition indicators for the Environmental Monitoring and Assessment Program (EMAP) - Great Lakes. Participated in several national EMAP workgroups, Ecological Indicators, Information Technology, and as Design Committee alternate. Developed database of on-going ORD indicators. Provided input to NCERQA indicators RFA (2 yrs, \$12M), NRC SOW, and SAB review panel composition and charge. Wrote or revised statement of work and QAPP for LLO CRADA, Region 5/St. Louis River REMAP, NRRI and NRC cooperative agreements, IAGs with GSA/Dyntel, NOAA, IJC, and NBS, guest worker LOUs, and justifications for continuance of several of the above. Assisted in funding decisions. Participated in strategic planning for the Indicators Team, the Watershed Team and the Ecosystem Response Team, and assisted Branch Chief in interfacing teams. Facilitated \$50K capital equipment buy. Assisted in ORACLE database development and data migration.

#### **Research Assistant/Ph.D. Graduate Student in Toxicology**

##### Dates

##### Employer

09/91 - 1995

University of MN Natural Resources Research Institute

**Brief Description of Position:** Development of a mode of action database for anticonvulsants; encoding and entry of pertinent literature. Development of a second database which describes macromolecules (in terms of crystal structure, gene or protein sequence, etc.) that potentially interact with anticonvulsants. These data are being used in the NIH New Drug Design Program correlating 3-dimensional ligand-receptor complex conformational information with pharmacokinetics, anticonvulsant structures, and structure activity relationships. Development of quantitative structure activity relationships (QSAR) and quantitative structure property relationships (QSPR) to aid in the development of novel pharmaceuticals including anticonvulsants (already submitted to NIH for testing) and anti-glaucoma agents. Assisted in the development of new environmentally relevant compounds including structural modifications of CFCs.

Development and assessment of non-empirically based molecular similarity methods using topological, geometrical, and quantum chemical descriptors; prediction of bioactivity using QSAR, QSPR, and similarity methods on both large diverse databases (e.g., EPA TOSCA List, CAS registry listings) and smaller discrete datasets (i.e., unique chemical class or known mode of action).

#### **Research Supervisor**

##### Dates

##### Employer

10/93 - 03/95

Integrated Laboratory Systems

**Brief Description of Position:** Responsible for directing technical work on work assignments, fulfilling line management duties for technical staff, and ensuring the technical quality of work products. Provided technical supervision and direction to contract staff (three research chemists, one electronics engineer, two research biologists, three chemists, and three biologists) supporting studies in dioxin (furans, PCBs, xenobiotics), toxicokinetics/toxicodynamics, environmental monitoring and exposure assessment (EMAP), and physiologically-based toxicokinetic (PBTK) modeling in fish. Ensured conformance to EPA policies and directives, ensured scientific soundness of technical approach, reviewed pertinent scientific literature and integrated findings into current studies, provided final quality assurance review of data, as well as providing analytical chemistry and biological support to each of these projects. This included participation, coordination, and direction in technical activities

associated with the determination of physiological, cellular, and biochemical effects of xenobiotics (and metabolites) in whole organisms and sub-organismal samples. Technical activities also included collection and interpretation of population/ecosystem (Great Lakes) response data, devising methods to assess gastrointestinal function in fish, writing research plans (for all of the above-mentioned projects) including quality assurance plans, reviewing quality assurance management plans, revising methodology, statistically analyzing, interpreting and reporting data, and providing assistance in the lab as needed (both obtaining and analyzing samples).

During this period, but not associated with the EPA contract position, I have assisted with writing and revising of several ILS proposals on mutagenicity, aquatic genotoxicity, macroinvertebrate identification and enumeration, pesticide re-registration, fate and exposure and surface water quality modeling, amphibian toxicity, and holistic and historic risk assessment methodology.

### **Research Chemist**

#### Dates

05/93 - 09/93

#### Employer

U.S. EPA

Brief Description of Position: Assisted in planning mesocosm field study, with primary responsibility for studies in bioaccumulation vs. effects endpoints (i.e., distress, death or growth) in fish. This information was used to compare current exposure-based criteria to possible residue-based criteria. Developed and/or validated analytical methods to analyze nonylphenol residues in water and fish samples. Collected field samples, analyzed samples, statistically analyzed data, and reported results.

### **Consultant**

#### Dates

03/93 - 04/93

#### Employer

Scientific Applications International Corporation

Brief Description of Position: Assisted in writing a technical proposal on toxicological and ecological effects research (funded by EPA \$7,000,000).

### **Supervisory Research Chemist**

#### Dates

04/89 - 06/92

#### Employer

ASCI Corp.

Brief Description of Position: Assisted in the development and validation of an interactive fish physiologically-based toxicokinetic model. Provided analytical and biological (dissection, participation in animal surgery, physiologically monitoring, etc.) support for aquatic toxicological pharmacokinetics studies; elucidation of rates and routes of chemical uptake, distribution, metabolism, and elimination in chambered and free-swimming fish. Determined *in vitro* and *in vivo* chemical partition coefficients for volatile hydrocarbons in fish tissues. Developed analytical methods and procedures for selected organic exposure chemicals and their metabolites. Developed and performed quality assurance and quality control practices and procedures. Gathered, organized, and analyzed scientific data. Summarized this data in reports, journal articles, and scientific presentations. Studied the feasibility of incorporating isolated perfused liver preparations to help assess dosimetry and provide a link between cell damage in isolated hepatocyte cultures to cell damage in an intact organism. Managerial and supervisory duties for four students, four chemists, and a Ph.D. senior scientist for the Ecorisk Effects Modeling and Biotechnology research groups.

### **Chemist/Research Specialist**

#### Dates

10/87 - 04/89

#### Employer

University of WI Center for Lake Superior Environmental Studies

**Brief Description of Position:** Worked as part of a team in developing aquatic field testing protocols to satisfy EPA guideline requirements of pesticides in the natural environment. Assisted in planning field study, based on ecological questions and regulatory need. Ran modeling simulations to estimate expected environmental concentrations in various compartments (water, sediment, plant, fish, and enclosure barrier walls) and performed trace chemical analysis for pesticide residues in these compartments. Statistically analyzed data and reported results. Devised methods for residue analysis, wrote SOPs, and instructed other researchers in the use of analytical instrumentation, laboratory procedures, and computer and software use. Wrote monthly reports in fulfillment of contractual obligations to the EPA and assisted in writing the grant proposals to procure funding for the cooperative agreement. Supervised three student employees.

### **Bioassay Chemist**

Dates

Employer

10/86 - 09/87

AScI Corp.

**Brief Description of Position:** Planned, designed, and coordinated leaf litter decomposition study, including: sampler construction, field sampling, sample analysis, data review, preliminary (and final) protocol development report, and participation in technology transfer workshop. Performed Aquatic Information Retrieval (AQUIRE) database review and encoding. Designed and performed fish and invertebrate bioassays and toxicity tests in laboratory and field including measurements of both biological and chemical parameters; cultured organisms and revised culture methods. Biological endpoints included growth, various signs of distress, and death. Compiled and edited manuscripts, proposals, and AScI monthly and annual reports. Initiated discussions with University of MN on possible incorporation of microbiological studies into field validation study. Performed environmental chemistry testing including analysis of pesticides in water and sediment samples and analytical methods determination for pesticides and herbicide analysis.

### **Chemist**

Dates

Employer

05/86 - 09/86

University of WI Center for Lake Superior Environmental Studies

**Brief Description of Position:** Defined leaf litter decomposition study through extensive literature review and discussions with other researchers. Analyzed litter bag samples for percent carbon, percent nitrogen, phosphorus, and total viable microbial numbers. Analyzed weekly pond water samples for pH, color, alkalinity, turbidity, and total dissolved organic carbon. Assisted other researchers within the field validation study by making samplers, study site preparation, sample collection, data entry, chlorophyll analysis, and mortality counts.

### **Owner/Manager**

Dates

Employer

08/80 - 05/86

Duluth-Superior Bottle Gas

**Brief Description of Position:** Owned and managed propane cylinder business, gross sales \$250,000. Purchased equipment, arranged financing, and worked in sales, accounts payable, and accounts receivable. Kept records, filed tax returns, and prepared monthly, quarterly, and annual reports.

### **AWARDS, HONORS AND GRANTS**

National Merit (1973)

Who's Who Among American High School Students (1973)

Special Merit, UWS-CLSES (1987, 1988)

All Star Team Award - Toxicokinetics Group, EPA ERL-D (1990)

Special Achievement Award for Superior Performance, AScl (1990)  
Who's Who Registry of Rising Young Americans (1993)  
Nominated for Scientific and Technological Achievement Award (1998)

## PUBLICATIONS

### Peer-Reviewed Journals

Balaban, A.T., S.L. Bertelsen, and S.C. Basak. 1993. New centric topological indexes for acyclic molecules (trees) and substituents (rooted trees), and coding of rooted trees. *J. Math. Appl. Chem.*

Basak, S.C., S.L. Bertelsen, and G.D. Grunwald. 1994. Use of graph theoretical parameters in risk assessment of chemicals. *J. Math. Appl. Chem.*

Basak, S.C., S.L. Bertelsen, and G.D. Grunwald. 1993. Application of graph theoretical parameters in quantifying molecular similarity and structure-activity relationships. *J. Chem. Inf. Comput. Sci.*

Batterman, A.R., S.L. Batterman, K.M. Jensen, and F.W. Whiteman. 2000. Data quality objectives in environmental research planning. *Quality Assurance: Good Practice, Regulations and Law* 7:181-194.

Bertelsen, S.L. and S.C. Basak. Substituent effects on the anticonvulsant activity of N,N-dimethyl benzyl carbamates. *Med. Sci. Rev.* (in preparation).

Bertelsen, S.L., A.D. Hoffman, C.A. Gallinat, C.M. Elonen, and John W. Nichols. 1998. Evaluation of log  $K_{ow}$  and tissue lipid content as predictors of chemical partitioning to fish tissues. *Environ. Toxicol. Chem.*

Detenbeck, N.E., J.W. Arthur, S.L. Bertelsen, J.C. Brazner, V.M. Snarski, D.L. Taylor, and J.A. Thompson. Western Lake Superior comparative watershed study. *Environ. Toxicol. Chem.* (in press).

Detenbeck, N.E., S.L. Batterman, V.J. Brady, J.C. Brazner, V.M. Snarski, D.L. Taylor, J.A. Thompson, and J.W. Arthur. 2000. A test of watershed classification systems for ecological risk assessment. *Environ. Toxicol. Chem.* 19:1174-1181.

Detenbeck, N.E., S.L. Batterman, V.J. Brady, J.C. Brazner, V.M. Snarski, D.L. Taylor, and J.A. Thompson. 1998. The Western Lake Superior comparative watershed framework: A test of geographically-dependent vs. geographically-independent, threshold-based watershed classification systems for ecological risk assessment., Proceedings from Case Studies Session, Modeling and Measuring the Vulnerability of Ecosystems at Regional Scales for Use in Ecological Risk Assessment and Risk Management, August 7-10, Seattle, WA.

Hoffman, A.D., S.L. Bertelsen, and M.L. Gargas. 1991. An in vitro gas equilibration method for the determination of chemical partition coefficients in fish. *J. Comp. Biochem. Physiol.*

McKim, J.M., J.W. Nichols, G.J. Lien, and S.L. Bertelsen. 1995. Kinetics of dermal uptake of three chloroethanes in channel catfish *Ictalurus punctatus* (Rafinesque). *Appl. Toxicol. Pharmacol.*

McKim, J.M., J.W. Nichols, G.J. Lien, A.D. Hoffman, and S.L. Bertelsen. 1993. Kinetics of dermal uptake of three chloroethanes in rainbow trout (*Oncorhynchus mykiss*). *Appl. Toxicol. Pharmacol.*

McKim, J.M., J.W. Nichols, G.J. Lien, and S.L. Bertelsen. Respiratory-cardiovascular physiology and chloroethane gill flux in the channel catfish (*Ictalurus punctatus*). *Aquat. Toxicol.*

Nichols, J.W., J.M. McKim, G.J. Lien, A.D. Hoffman, S.L. Bertelsen, and C.A. Gallinat. 1993. Physiologically based modeling of three waterborne chlorinated ethanes in channel catfish (*Ictalurus punctatus*). *Appl. Toxicol. Pharmacol.*

Nichols, J.W., J.M. McKim, G.J. Lien, A.D. Hoffman, and S.L. Bertelsen. 1991. Physiologically based toxicokinetic modeling of three chloroethanes in rainbow trout (*Oncorhynchus mykiss*). Appl. Toxicol. Pharmacol.

### **EPA Reports**

Bertelsen, S.L., A.D. Hoffman, and C.A. Gallinat. 1993. Determination of in vitro chemical partition coefficients in fish tissues: A comparative study of four species. U.S. EPA.

Brazner, J.B., S.J. Lozano, M.L. Knuth, S.L. Bertelsen, L.J. Heinis, D.A. Jensen, E.R. Kline, S.L. O'Halloran, K.W. Sargent, D.K. Tanner, and R.E. Seifert. 1988. The effects of chlorpyrifos on a natural aquatic system: A research design for littoral enclosure studies and final research report. U.S. EPA.

Brazner, J.B., S.J. Lozano, M.L. Knuth, L.J. Heinis, D.A. Jensen, K.W. Sargent, S.L. O'Halloran, S.L. Bertelsen, D.K. Tanner, and E.R. Kline. 1987. A research design for littoral enclosures and preliminary data report. U.S. EPA.

Lozano, S.J., J.B. Brazner, M.L. Knuth, L.J. Heinis, K.W. Sargent, D.K. Tanner, L.E. Anderson, S.L. O'Halloran, S.L. Bertelsen, D.A. Jensen, E.R. Kline, M.D. Balcer, F.S. Stay, and R.E. Seifert. 1989. Effects, persistence and distribution of esfenvalerate in littoral enclosures. U.S. EPA.

Development and validation of a fish physiologically-based toxicokinetic model for use in environmental risk assessment. 1990. Annual technical report on IAG-AFOSR-ISSA-89-0060.

### **INVITED PRESENTATIONS**

Bertelsen, S.L. and D.K. Tanner. 1987. Leaf litter decomposition and nutrient cycling. Oral and poster presentation, EPA Workshop on Aquatic Field Testing: Experimental Mesocosms and Field Techniques.

Hoffman, A.D. and S.L. Bertelsen. 1989. The determination of *in vivo* and *in vitro* chemical partition coefficients in fish tissues for use in physiologically based toxicokinetic modeling. Poster presentation, Society of Environmental Toxicology and Chemistry Annual Meeting.

McKim, J.M., J.W. Nichols, G.J. Lien, and S.L. Bertelsen. 1991. Kinetics of dermal uptake of three chloroethanes in rainbow trout (*Oncorhynchus mykiss*). Poster presentation, Society of Environmental Toxicology and Chemistry Annual Meeting.

Lozano, S.J., E. Kline, and S.L. Bertelsen. 1991. The moderating influence of body lipid on esfenvalerate uptake. Poster presentation, Society of Environmental Toxicology and Chemistry Annual Meeting.

Erickson, R., G. Lien, A. Hoffman, S. Bertelsen, J. McKim, and C. Elonen. 1994. Mechanisms regulating the uptake of ionizable organic chemicals by fish. Poster presentation, Society of Environmental Toxicology and Chemistry Annual Meeting.

Nichols, J., P. Fitzsimmons, F. Whiteman, S. Bertelsen, T. Dawson, and J. Jeunemann. 1996. A physiologically-based kinetic model for dietary uptake of hydrophobic organic compounds by fish. Poster presentation, Society of Environmental Toxicology and Chemistry Annual Meeting.

Brazner, J., L. Anderson, J. Arthur, S. Bertelsen, R. Carlson, N. Detenbeck, C. Elonen, F. Puglisi, V. Snarski, D. Tanner, D. Taylor, J. Thompson, and D. Yount. 1997. The comparative watershed study framework in the Western Lake Superior Basin. Watershed and Ecosystems Effects Research Team (Aquatic ecosystems indicators and responses team). Posters for Mid-Continent Ecology Division Lab Peer Review, Duluth, MN.

Detenbeck, N.E., J.C. Brazner, S.L. Bertelsen, V.M. Snarski, D.K. Tanner, D.L. Taylor, and J.A. Thompson. 1997. Lake Superior comparative watershed study: A framework for evaluating the impacts of forest fragmentation on north and south shore streams. Midwest Fish and Wildlife Conference, Milwaukee, WI.

Bertelsen, S.L., N.E. Detenbeck, J.C. Brazner, V.M. Snarski, D.L. Taylor, J.A. Thompson, and V.J. Brady. 1998. Western Lake Superior comparative watershed study: A framework for evaluating the impacts of forest fragmentation. Poster presentation, U.S. EPA NHEERL Symposium on Research Advances in Risk Assessment Workshop, Risk Assessment Forum, RTP, NC.

Batterman, S.L., N.E. Detenbeck, L.A. Jagger, and S.L. Stark. 1999. Components of variability in Western Lake Superior landscapes. Oral presentation, Annual NABS Meeting, Duluth, MN.

Tanner, D.K., J.C. Brazner, S.L. Batterman, N.E. Detenbeck, V.M. Snarski, and K.A. Olsen. 1999. The relative influence of regional, watershed and site-specific environmental factors on stream fish assemblages in the Lake Superior Basin. Poster presentation, Annual NABS Meeting, Duluth, MN.

Brady, V.J., N.E. Detenbeck, J.C. Brazner, S.L. Batterman, C.M. Elonen, D.K. Tanner, V.M. Snarski, and J.A. Thompson. 1999. Effects of watershed level habitat fragmentation on macroinvertebrate communities in relatively undisturbed Lake Superior streams. Poster presentation, Annual NABS Meeting, Duluth, MN.

Brady, V.J., N.E. Detenbeck, S.L. Batterman, J.C. Brazner, V.M. Snarski, and D.L. Taylor. 2001. Detecting levels of sustainable land-use in Lake Superior watersheds using stream invertebrate communities. 3rd North American Forest Ecology Workshop, Duluth, MN, June 24-27.

Brady, V.J., N.E. Detenbeck, S.L. Batterman, J.C. Brazner, V.M. Snarski, and D.L. Taylor. 2001. Detecting stream invertebrate community alteration due to mid to low levels of watershed landscape modification. Annual North American Benthological Society Meeting, LaCrosse, WI, June 3-8.

Detenbeck, N.E., C.M. Elonen, L.E. Anderson, T.M. Jicha, D.L. Taylor, and S.L. Batterman. 2001. Field tests of geographically-dependent vs. threshold-based watershed classification schemes in the Great Lakes basin. North American Benthological Society Meeting, LaCrosse, WI, June 3-8.

Snarski, V.M., N.E. Detenbeck, S.L. Batterman, J.D. Brazner, and D.K. Tanner. 2001. Determining the influence of landscape and reach-specific habitat variables on variation of thermal characteristics of streams within western Lake Superior watersheds. 34th Annual Meeting of the MN Chapter of the American Fisheries Society, Fargo, ND, March 5-7.

Brazner, J.C., D.K. Tanner, V.M. Snarski, and S.L. Batterman. 2001. The influence of forest fragmentation and other environmental factors on Lake Superior stream fish assemblages. Annual Meeting of American Fisheries Society, WI Chapter, Superior, WI, January 10.